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Experimental Farms Service

COST ACCOUNTING FOR AGRICULTURE

PART II METHODOLOGICAL PROCEDURE FOR DETERMINING COST
OF PRODUCING DAIRY PRODUCTS

by

I. F. Furniss



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Illustration Stations Division

Central Experimental Farm

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FOREWORD

This is the second in a series of monographs outlining procedures that can be followed to determine the costs of production for various farm enterprises. The first monograph in this series appeared in February, 1958, and was titled:

"Part I Methodological Procedures for Determining Costs of
Producing Farm Crops"

and had specific application to crops in a five-year rotation of summerfallow, wheat, oats, hay, and hay.

These monographs have been prepared primarily for the guidance of Research Officers of the Illustration Stations Division, but the procedures as outlined are applicable to other farms than Illustration Stations.

In outlining this procedure for determining the costs of producing dairy products, an attempt has been made to account for all known costs with the exception of management. Returns for risk-taking and management in dairying have been calculated as a residual, with provision made to determine the long-run average returns for this factor.

Data used in this example applied to an Illustration Station farm unit in eastern Ontario. These data should not be considered as standards in any respect but only to illustrate the methodology that can be employed in determining costs of dairy production in detail.

It is hoped to prepare further monographs on various other farm enterprises as time permits and demand justifies. The principles of this procedure for dairying could be applied to many other livestock enterprises with only slight modifications.


A. E. Barrett, Chief,
Illustration Stations Division.

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Mr. Wm. Kalbfleisch, Senior Agricultural Engineer, Field Husbandry, Soils and Agricultural Engineering Division, Central Experimental Farm, provided estimates of replacement values for certain of the farm buildings.



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COST ACCOUNTING FOR AGRICULTURE

Part II Methodological Procedure for Determining Cost of Producing Dairy Products

by

I. F. Furniss*

INTRODUCTION

Farm cost accounting is primarily a research procedure. The general objective is to determine in detail the physical inputs and costs of same involved in producing dairy products for a given set of limiting conditions. Some of these limiting factors are: climate, soils, breed of livestock, farm organization, and markets. While the precisely determined figures are not exactly applicable to any but the given set of conditions, this fact does not invalidate or seriously limit the usefulness of cost studies.

Certain limitations to farm cost accounting must be recognized.

1. It often fails to produce correct answers to the farmer's problems. While there may be many cases where the overall economy of the farm is being undermined by one or two high cost enterprises in an otherwise sound farming system, there are many more where the trouble lies in poor organization of the farm as a whole, or in inefficiency in a particular aspect of management which affects all the enterprises.
2. The lowest cost per unit is not necessarily synonymous with maximum profit for the farm.
3. The biological nature of the agricultural industry and the many variables found in the environment limit the value of cost of production analyses.
4. Cost of production calculations for agriculture are difficult, time consuming, and costly in relation to the size of the individual enterprises. In unstable price periods, cost figures become out of date rapidly.
5. Single enterprise cost analyses should not be attempted for enterprises which contribute less than 30 per cent of the farm income.

General Objectives:

1. To determine and outline the conditions which give the optimum use of capital, labor, and management in the production process.

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2. To determine the extent to which the existing use of resources deviates from the optimum use.
3. To analyze the forces that condition production patterns and resource use.
4. To explain means and methods in getting from the existing to optimum use of resources.

Specific Objectives:

1. To measure the impact and relative importance of the cost of the individual physical inputs on total cost.
2. To measure any changes or trends in efficiency of utilization of the various factors of production.
3. To measure the effect of environment as represented by type of market on costs and profits.
4. To determine long-term returns for risk-taking and management for the dairy enterprise.

Cost of Producing Dairy Products

The procedure for determining the costs of producing milk may be divided into two parts:

- A. Fixed Costs
- B. Variable Costs

The fixed costs or overhead costs are those charges that must be borne by the enterprise regardless of the volume of output. They are long-run costs and include charges for:

- 1. Buildings and fences
- 2. Use of land (pasture)
- 3. Dairy equipment
- 4. General equipment
- 5. Replacement costs and interest charges for livestock
- 6. General farm expenses.

Year-round labor is often considered a fixed cost also but for this procedure all labor is included under variable costs.

Variable costs are those charges that are a direct function of output. They are short-run costs and include, for purposes of this procedure, the following:

- 1. Feed, purchased and home-produced
- 2. Labor, both seasonal and year-round
- 3. Bedding
- 4. Veterinary
- 5. Supplies
- 6. Miscellaneous
- 7. Interest on production expenses, or working capital.

Variable costs are often considered to be those that can be altered by management in the short-run period.

A. FIXED COSTS

1. Building and Fencing Charge:- This includes interest, depreciation, and maintenance costs on all buildings for housing dairy cattle and feed storage. In the case of buildings jointly occupied with other livestock or feed for other livestock, the proportionate share will be charged to the dairy enterprise on the basis of the amount of space occupied.

Charges for fences are allocated between crops and livestock on the premise that where both occur on a farm (or in the district), fences are equally necessary regardless of the size of the enterprises.

Depreciation rates used were as allowed by the Department of National Revenue, Income Tax Division, Part XVII Method*. Interest charges were made at 4.5 per cent on half the replacement value of each item. Maintenance costs were average annual costs as shown by actual records for the particular farm with an allowance for the value of hired farm labor, operator, and family help. For any one farm, the building and fencing charge will not have to be recalculated each year until significant changes occur in replacement and maintenance values, or if new buildings are added to the inventory, or if there is a significant change in the proportion of farm income derived from the enterprise being studied out of the total income.

2. Use of Land (Pasture):- This is an implicit cost and represents the alternative interest that could be earned by investing the value of the land in first mortgages on farm land or else the alternative cost of renting land. It may be arrived at in two ways:

- A. By assessing an interest charge based on the net return from farm mortgages (first mortgages) against the value of the land plus taxes and other landlord costs. The rate of interest was taken to be 5 per cent in the example.
- B. By charging the going rate for rented land of the same class in the area. This was \$6.00 per acre for average quality native pasture land in 1956 and \$7.65 per acre in 1957, in the case of the example farm. This method includes the equivalent tax charge on the land in the rental charge.

Land use costs as calculated by each of these two methods follow. Land costs for home-grown feeds were not included in this section.

Method A.

Value per acre of land, excluding buildings, was:

\$40.00 per acre (Table 1)

Interest at 5 per cent on this was:

$\$40.00 \times .05 = \2.00 per acre

*See Appendix, Table 1.

Table 1 sets forth the inventory of the example farm in land and improvements at a 'normal' sale value for the land without buildings and at replacement values for improvements.

Inventory of Land and Improvements at 1956-57 Replacement Values

Item	Specifications	Unit Cost	Total Cost
Land	200 acres, including 106 improved	\$40.00 per acre	\$ 8,000
Fences	1,350 rods of 12 gauge barbed wire,	\$1.20 per rod for materials	
	3 strands, cedar posts	\$0.40 per rod for own labor	
		and equipment charge	2,165
Barn (one)	Canadian Farm Bldg. Plan Service No.	\$400 per head for materials,	
	C156-2011 Gambrel Roof, 66' x 36',	incl. stanchions, and contract	
	20 stalls, 5 pens (for 36 head)	labor.	14,400
Silos (two)	Canadian Farm Bldg. Plan Service No.	\$2,000 each for materials,	
	C156-2071, vertical concrete block	\$250 each for contract labor	
		\$250 each for own labor	5,000
Milk House	Can. Farm Bldg. Plan Service No.	\$4.00 per sq. ft. for materials	
	C156-2051, 12' x 14' frame on	\$350 for equipment and contract	
	concrete blocks	labor, \$2.10 for own labor	1,270
Garage	14' x 20' frame bldg. on concrete slab	\$1.55 per sq. ft. for materials	
		\$146 for labor	580

Table 2 specifies the annual charges for buildings and fences.

Building and Fencing Charges for Dairy Enterprise at 1956-57 Replacement Values

Building	Value	Depreciation		Annual Interest		Average		Total	Share to Dairy	Amount to Dairy
		Rate	Amount	Rate	Amount	Charge on 1/2 Value	Maintenance (Materials & all labor)			
	\$	%	\$	%	\$	\$	\$	\$	%	\$
Barn (one)	14,400	5	720	4.5	324	41	1,085	1,085	100	1,085
Silos (two)	5,000	2.5	125	4.5	112	14	251	251	100	251
Milk House	1,270	5	64	4.5	29	4	97	97	100	97
Fencing	2,165	5	108	4.5	49	25	182	182	90% of 50%	82
Total	22,835		1,017		514	84	1,615	1,615		1,515

Tax bill in 1956 was \$485.00 for 200 acres of land and buildings. Share of taxes to land is that proportion which the land value is of the total inventory value of land and improvements (17.8 per cent for the example).

Taxes for land were then:

$$\$485.00 \times .178 = \$86.33$$

Taxes per acre were then:

$$\$ 86.33 \div 200 = \$0.43$$

Land use costs per acre in 1956 were then:

$$\$2.00 + \$0.43 = \$2.43 \text{ per acre}$$

Acres of pasture land were 114 acres pastured all season plus 13 acres of aftermath pasture (taken as 6.5 acres of pasture or one-half of total production) giving a total pasture acreage of 120.5 acres and a total pasture charge of:

$$120.5 \times \$2.43 = \$293.00$$

Tax charges in 1957 were \$496.00 on the total property. Share of this to land continued at 17.8 per cent. Tax charge for land was then:

$$\$496.00 \times .178 = \$88.29$$

Tax charges per acre were then:

$$\$ 88.29 \div 200 = \$0.44$$

Interest charges on land continued unchanged at \$2.00 per acre.

Land use costs per acre in 1957 were then:

$$\$2.00 + \$0.44 = \$2.44 \text{ per acre}$$

Acres of pasture land were 68 acres pastured all season plus aftermath on 34 acres (taken as 17 acres of pasture) giving a total pasture acreage of 85 acres and a pasture charge of:

$$85.0 \times \$2.44 = \$207.00$$

Method B.

Acres of pasture in 1956, including aftermath were 120.5 acres (from above A).

Charge for pasture grazing was then:

$$120.5 \times \$6.00 = \$723.00$$

Acres of pasture in 1957, including aftermath were 85.0 acres (from above A).

Charge for pasture grazing was then:

$$85.0 \times \$7.65 = \$650.00$$

For the purposes of this study, the charge calculated by Method A was accepted as the proper charge as the acreage of rented pasture available was limited and would represent a higher charge for pasture than could be considered as a representative overall charge.

Land use costs for pasture are summarized in Table 3. (See page 9)

3. Dairy Equipment Charges:- These include interest, depreciation, and maintenance on all dairy equipment. Depreciation rates were those allowed by the Department of National Revenue, Income Tax Division*. Interest was charged on one-half replacement values and at a rate of 6 per cent. Maintenance and repairs were determined on the basis of average annual costs as shown by the records of the specific farm plus an allowance for the value of all labor on maintenance. These costs do not have to be recalculated each year unless there are significant changes in replacement and maintenance values, or if new items of equipment are added to the inventory.

Table 4 lists the complete equipment inventory for the example. (See page 10)
Table 5 gives the annual dairy equipment charges. (See page 11)

4. General Equipment Charges:- These include the share to the dairy enterprise of the costs of operating the farm truck and/or automobile, silo filler, feed crusher, and manure spreader. Since the value of home-grown feeds is charged at market values, this is assumed to include the dairy share of the costs of field equipment and the costs of other items of equipment such as the lime spreader, rubber tired wagon, hay racks, and sleighs. The dairy share of items used jointly with other enterprises are allocated on the basis of the average proportion of gross cash income from dairying. If time records are available of the amount of use of each machine on each job, these can be used to allocate joint costs between enterprises.

Annual truck fixed and operating costs are presented in Table 6 (see page 12) and other general equipment charges in Table 7 (see page 13). A charge for the use of the tractor for hauling manure, excluding labor, is included under General Farm Expenses (Table 10), (see page 17) also the operating costs, excluding labor, for a stationary engine.

*See Appendix, Table 1.

Table 3. - Pasture Charges per Day and Per Animal Unit 1956-57

Item	Source	1956	1957
1. Date Dairy Cattle Put Out on Pasture ^{a/}	Records	May 27	May 17
2. Date Dairy Cattle Taken in Off Pasture ^{a/}	Records	Oct. 12	Oct. 17
3. Days on Pasture		138	153
4. Charge for Pasture by Method A	Section A.2	\$293.00	\$207.00
5. Charge for Pasture by Method B	Section A.2	\$723.00	\$650.00
6. Charge per Pasture Day:			
Method A	(4) ÷ (3)	\$ 2.12	\$ 1.35
Method B	(5) ÷ (3)	\$ 5.24	\$ 4.25
7. Average Number of Animal Units in Herd	Table 8	48 a.u.	52 a.u.
8. Animal Units Raised and Sold or Eaten	Table 8	14 a.u.	17 a.u.
9. Total Number of Animal Units	(7) + (8)	62 a.u.	69 a.u.
10. Charge for Pasture per Animal Unit:			
Method A	(4) ÷ (9)	\$4.73	\$3.00
Method B	(5) ÷ (9)	\$11.66	\$9.42

^{a/} Records for Central Experimental Farm, Ottawa.

Table 4. - Inventory of Machinery and Equipment at 1956-57 Replacement Values

Equipment Item	No.	Value	Annual Depreciation	
			Rate ^{a/}	Amount
		\$	%	\$
Tillage Equipment	all	1,690	10	169
Seeding and Harvesting Equipment	all	4,565	10	457
Tractor, 3-plow	1	2,600	15	390
Truck, 1-ton	1	2,800	15	420
Manure Spreader	1	580	10	58
Lime Spreader	1	350	10	35
Rubber-Tired Wagon	1	250	15	38
Hay Racks	2	150	15	22
Sleighs	2	150	15	22
Silo Filler	1	600	10	60
Feed Crusher	1	200	10	20
Dairy Equipment:				
Vacuum Pump	1	140	10	14
Milking Machine	1	120	10	12
Cream Separator	1	200	10	20
Milk Cooler	1	450	10	45
Misc. Dairy Utensils	all	200	10	20
Electric Motors	2	100	10	10
Water Pump	1	125	10	12
Gutter Cleaner	1	1,800	10	180
Miscellaneous Barn Equipment	all	200	10	20
Total	-	17,270	-	2,024

^{a/} As allowed by the Dept. of National Revenue, Income Tax Division.
Part XVII Method.

Table 5. - Dairy Equipment Charges at 1956-57 Replacement Values

Equipment Item	Value	Annual Depreciation Charge (from Table 4)	Annual Interest Charge on One-Half Value at 6 Per Cent ^{1/}	Average Annual Maintenance (Parts and all Labor)	Total Annual Charges
	\$	\$	\$	\$	\$
Vacuum Pump	140	14	4.20)	
Milking Machine	120	12	3.60)	
Cream Separator	200	20	6.00)	
Milk Cooler	450	45	13.50)	
Misc. Dairy Utensils	200	20	6.00	)	33
Electric Motors	100	10	3.00)	
Water Pump and Engine	125	12	3.70)	
Gutter Cleaner	1,800	180	54.00)	
Misc. Barn Equipment	200	20	6.00)	
Total	3,335	333	100.00	33	466.00

^{1/} Values in this column were rounded to the nearest five cents. Cents were carried in this case because of the low values of individual items, otherwise they could have been ignored.

Table 6. - Cost of Truck Operation at 1956-57 Replacement Values

Make:.....Size: 1 ton Replacement Value: \$2,800

Item	Cost
Fixed Costs (1956-57):	\$
Interest (1/2 Replacement value x .06)	84.00
Depreciation (15%)	420.00
Average Annual Maintenance ^{a/} :	
Parts)
Labor: Contract	) 230.00
Own)
Housing: Interest (1/2 Replacement Value of Garage x .045)	13.00
Depreciation (5%)	29.00
Average Annual Maintenance (materials and labor)	2.00
Insurance	) 50.00
License)
Antifreeze	5.00
Total Fixed Cost	833.00
Operating Costs, 1956	
Fuel (224 gal.)	85.00
Oil	6.00
Grease & Labor	5.00
Filters	2.00
Total Operating Cost	98.00
	TOTAL COST 931.00
	Share to Dairy Enterprise \$931.00 x .89= 829.00
Operating Costs, 1957	
Fuel (300 gal.)	117.00
Oil	8.00
Grease and Labor	6.00
Filters	2.00
Total Operating Cost	133.00
	TOTAL COST 966.00
	Share to Dairy Enterprise \$966.00 x .89= 860.00

^{a/} for first five years of life or 60,000 miles, including tires.

Table 7. - Fixed Charges^{a/} for Other General Equipment
at 1956-57 Replacement Values

Item	Unit	Machine ^{b/}			Total
		Silo Filler	Feed Crusher	Manure Spreader	
Replacement Value	\$	600	200	580	
Depreciation (from Table 4)	\$	60	20	58	
Interest on Half Value at 6%	\$	18	6	17	
Average Maintenance (Parts & All Labor)	\$	6	2	6	
Total Charges	\$	84	28	81	
Proportion to Dairy	%	100	90	75	
Amount to Dairy	\$	84	25	61	170

^{a/} Operating costs are included under separate charges for man-labor and General Farm Expenses.

^{b/} Housing charges for these items were considered to be included in the building charges calculated in Table 2.

5. Replacement Costs and Interest Charges for Dairy Herd:- Herd replacement costs, which are also termed depreciation on livestock, can be determined on the basis of the difference between the average value of a producing animal and the cull value of animals sold in the current year divided by the average productive life of each class of livestock.^{1/} The average productive life of the milking cows, two years of age and over in the example, was taken at six years, cows being culled at about eight years of age on this farm. The length of useful breeding service for bulls was considered to be six years also. Feed maintenance costs, it should be noted, for breeding bulls and calves are included in this procedure under the section for "Feed Costs".

^{1/} It is recommended by the Animal and Poultry Science Division, Central Experimental Farm, that an average of four lactations can be considered representative of the productive life of milk cows, with one lactation per year.

Interest charges on the value of the dairy herd are an implicit cost and represent the equivalent return the capital investment in the herd could have earned if invested in securities. This was taken to be 6 per cent and was applied against the average inventory value of the dairy herd for the calendar year (Table 8). (See page 15).

Replacement costs and interest charges for the example are tabulated in Table 9. (See page 16).

6. General Farm Expenses:- These include all those items of farm expense necessary for the overall operation of the business and not accounted for previously. General farm expenses for the dairy enterprise include the proper share of such items as telephone, electricity, fuel for stationary engines, charge for tractor for general farm work, building and machinery fire insurance (other than on truck or automobile), livestock insurance and taxes on dairy buildings and share of fences. Certain of these items represent both personal and business expenditures and the first step is to determine the proportion chargeable to the business. The second step is then to determine how much of this is chargeable to the dairy enterprise. This may be done on the basis of the proportion of the gross cash income derived from dairying on the average (89 per cent in this example). In the case of insurance on livestock, this can be allocated according to the distribution of the livestock inventory. Fire insurance costs to dairy buildings can be prorated on the basis of the proportion of the building inventory in dairy buildings. It should be realized also that fire insurance premiums are often paid on a three-year basis. Telephone and electricity costs were arbitrarily allocated between personal and business use according to what seemed a reasonable basis. Truck and car expenses can be allocated on the basis of mileages. In the example, all the truck expenses were on business. No automobile expenses were considered chargeable to the business.

Taxes for dairy buildings and on the share of the fencing costs to the dairy herd were prorated on the basis of the proportion of the total inventory value.

In 1956, the total tax bill was \$485.00 for 200 acres of land with improvements. Taxes on dairy buildings and fences were:

$$\$485.00 \times .493 = \$239.00$$

This included the barn, silos, milk house, 89 per cent of the garage, and 90 per cent of one half of the value of the fencing.

In 1957, the total tax bill was \$496.00 for the same amount of land and improvements. Dairy buildings and share of fencing remained the same proportion of the inventory. Share of taxes to dairy herd, exclusive of those already included in the charge for pasture, were then:

$$\$496.00 \times .493 = \$245.00$$

General Farm expenses for the dairy herd in the case of the example are summarized in Table 10. (See page 17).

Table 8. - Inventory of Dairy Cattle at 1956-57 Replacement Values

Class of Live-stock and Year	Unit	Inventory at Jan. 1	Born or Purchased during Year	Sales and Used in Home	Died	Inventory at Dec. 31	Average Inventory
<u>1956</u>							
Dairy Cows:							
3-yr. old and over	head	23	-	4	2	29	26
	\$	4,600	-	647	350	5,800	5,200
2-yr. old	head	8	-	4	-	13	10
	\$	1,600	-	679	-	2,600	2,100
1-yr. old	head	17	-	-	-	11	14
	\$	1,700	-	-	-	1,100	1,400
Calves, under 1-yr. old	head	10	31 born	10	3	13	12
	\$	600	450	145	44	650	625
Bulls	head	2	1 bought	2	-	1	1.5
	\$	600	166	425	-	300	450
Totals:	Head	60	+32	- 20	- 5	= 67	64
	A. U.	44	13	14	2	53	48
	\$	9,100	616	1,896	394	10,450	9,775
<u>1957</u>							
Dairy Cows:							
3-yr. old and over	head	29	-	8	1	27	28
	\$	5,800	-	1,120	140	5,400	5,600
2-yr. old	head	13	-	5	-	12	12
	\$	2,600	-	1,085	-	1,800	2,200
1-yr. old	head	11	-	-	-	16	14
	\$	1,100	-	-	-	1,600	1,350
Calves, under 1-yr. old	head	13	27 born	7	3	13	13
	\$	650	300	219	30	975	812
Bulls	head	1	-	1	-	1	1
	\$	300	-	345	-	400	350
Totals:	Head	67	+ 27	- 21	- 4	= 69	68
	A. U.	53	11	17	2	52	52
	\$	10,450	300	2,769	170	10,175	10,312

A. U. - Grain Consuming Animal Units (See Appendix Table 7).

Table 9. - Replacement Costs and Interest Charges for Dairy Herd at 1956-57 Replacement Values

	Source	Unit	Milk Cows	Breeding Sires
<u>1956</u>				
1. Average Value per Head (2 years old and over)	Table 8	\$	203	300
2. Average Cull Value per Head	Sales	\$	162	250
3. Total Loss in Value per Head	(1) - (2)	\$	41	50
4. Useful Life	Section A. 5 Years		6	6
5. Loss in Value per Head per Year	(3) ÷ (4)	\$	6.83	8.33
6. Average Number in Herd (2 years old and over)	Table 8	Head	36	1.5
7. Total Replacement Cost	(5) x (6)	\$	246	12
			Dairy Herd	
8. Average Inventory Value of Dairy Herd	Table 8	\$	9,775	
9. Interest Charge at 6%	(8) x .06	\$	586	
10. Total Interest and Replacement Costs	(7) + (9)	\$	844	
<u>1957</u>				
1. Average Value per Head (2 years old and over)	Table 8	\$	195	350
2. Average Cull Value per Head	Sales	\$	140	300
3. Total Loss in Value per Head	(1) - (2)	\$	55	50
4. Useful Life	Section A. 5 Years		6	6
5. Loss in Value per Head per Year	(3) ÷ (4)	\$	9.17	8.33
6. Average Number in Herd (2 years old and over)	Table 8	Head	40	1.0
7. Total Replacement Cost	(5) x (6)	\$	367	8
			Dairy Herd	
8. Average Inventory Value of Herd	Table 8	\$	10,312	
9. Interest Charge at 6%	(8) x .06	\$	619	
10. Total Interest and Replacement Costs	(7) + (9)	\$	994	

Table 10. - General Farm Expenses, 1956-57, at Current Values

Expense Item	Total Cost	Share to Business	Share to Dairy	General Farm Expense for Dairy
	\$	%	%	\$
<u>1956</u>				
Building Fire Insurance	72.54	-	61.0	44.00
Livestock Insurance	-	100	80.0	-
General Machinery Insurance	-	-	-	-
Telephone	76.05	50	89.0	34.00
Electricity	194.33	75	89.0	130.00
Fuel for Stationary Engine	156.00	100	100	156.00
Charge for Use of Tractor ^{1/}	21.00	100	100	21.00
Miscellaneous Items	15.50	100	89.0	14.00
Taxes on Dairy Buildings	(See explanation in Section A.6)			239.00
Total General Farm Expense to Dairy				638.00
<u>1957</u>				
Building Fire Insurance	72.54	-	61.0	44.00
Livestock Insurance	-	100	79.0	-
General Machinery Insurance	-	-	-	-
Telephone	74.20	50	89.0	33.00
Electricity	206.07	75	89.0	138.00
Fuel for Stationary Engine	154.00	100	100	154.00
Charge for Use of Tractor ^{1/}	21.00	100	100	21.00
Miscellaneous Items	15.00	100	89.0	13.00
Taxes on Dairy Buildings	(See explanation in Section A.6)			245.00
Total General Farm Expense to Dairy				648.00

^{1/} for hauling manure only. Charge was based on 30 hours of tractor use at a cost per hour for fixed and operating expenses of tractor, but excluding labor, of 70 cents per hour.

7. Management Costs for the Dairy Herd:-Management costs in agriculture, as in other self-employed industries, are difficult to assess. In these industries, management is rarely hired, consequently it is not usually possible to evaluate it on an alternative cost basis. The returns to management and risk-taking are in fact the residual between total costs, excluding management, and gross receipts. Gross receipts fluctuate from year to year (or accounting period to accounting period) depending on such factors as yields, prices and other fortuitous circumstances, particularly in crop production. Thus, for purposes of comparative studies of the costs of production in agriculture on an inter-enterprise or intra-enterprise basis, the use of a management charge independent of such fortuitous circumstances is often desirable.

No charge was made for management for the dairy enterprise in this procedure but instead the residual return for risk-taking and for management was calculated. This, it is hoped, should be the means of establishing long-term average returns for these factors at a specific location and for a specific farm operator engaged in dairying as his main agricultural pursuit. This return was obtained by subtracting the "Net Production Cost" from the "Value of Milk Produced."

B. VARIABLE COSTS FOR DAIRY ENTERPRISE

These will include costs for items which vary with production and for this procedural example include the following:

1. Feed, both purchased and home-produced
2. Labor, both operator, hired farm labor and 'unpaid' family help
3. Bedding
4. Veterinary
5. General dairy supplies (consumable)
6. Miscellaneous expenses (registration fees, Record of Performance or Dairy Herd Improvement Association dues, hired trucking, commissions, advertising, salt, bonemeal, stable phosphate and other such items).

1. Feed Costs:-Purchased feeds were charged at the price laid down at the farm. Home-produced feeds were charged at the local market value for:

- (a) baled hay or equivalent feed value in silage plus an allowance for the additional labor required for silage
- (b) bulk whole grain, and
- (c) skim milk fed to calves was charged at the cost of an equivalent amount of protein concentrate, considering the milk to have an average analysis of 3.4 per cent protein. Thus, at \$70.00 a ton for linseed oil meal of 23.4 per cent protein (468 pounds of protein in one ton of meal), the cost per pound for protein is 15 cents and one hundred-weight of skim milk is then worth:

$$3.4 \text{ pounds} \times 15 \text{ cents} = 51.0 \text{ cents.}$$

The amounts of skim and/or whole milk fed to calves were calculated by taking total production less total sales of pounds of whole milk and milk used in the home (see Table 18 for quantities).

Feed costs for breeding sires were also considered included in this section.

Quantities of home-produced grains and hay fed to the dairy herd were determined by calculating the average amounts of feed required for the minor livestock enterprises*. Purchased feed was deducted from total requirements to obtain the amount supplied by the farm. The balance of the feed used on the farm in the year was then credited to the dairy herd. All silage produced went to the dairy herd. Feed consumption from home production could also be obtained by sampling once a month; such data could then be checked against the disposition of feed supplies as calculated above. In Table 6 of the Appendix there is presented a suggested feed sampling form to be completed by a technician once a month.

Tables 11 to 13 (see pages 20-22) outline the derivation of the feed costs for the dairy herd. Table 3 in the Appendix gives the inventory of other grain-consuming animal units on the example farm.

2. Labor Costs:-Total labor available for all farm work on the example farm in 1956-57 was 24 man-months of operator labor (father-son arrangement). The amount of labor chargeable to the dairy enterprise was estimated on the basis of average labor requirements for dairying in Eastern Canada under the given type of buildings and equipment^{1/}. It was estimated that a total of 5,335 man-hours (21.3 man-months) of labor were required in 1956 and 5,845 man-hours (23.4 man-months) in 1957. Labor requirements should be determined if possible on the basis of a once-a-month sampling by the technician in charge of the project using the form given in Table 5 of the Appendix.

Labor should be charged at the current wage, including a charge for the value of board if provided, or the current wage without board for dairy farm labor employed year-round. This was taken at \$152 per month for 1956 and \$155 per month for 1957^{2/}.

Total charges for labor for the dairy enterprise were then:

In 1956: $21.3 \times \$152 = \$3,238$

In 1957: $23.4 \times \$155 = \$3,627$

All miscellaneous labor required in connection with the dairy enterprise such as feeding calves, grinding feed, etc., was considered to be included in these total man-months.

* Ref. No. 16

^{1/} Ref. No. 8, pp.8-9

^{2/} Ref. No. 1 may be used as a guide

Table 11. --Inventory of Home Produced Feeds, 1956-57, at Market Values

Class of Feed and Year	Unit	Inventory at Jan. 1	Production This Year	Purchases This Year	Sales This Year	Used on Farm ^{a/}	Inventory at Dec. 31	Average Inventory
<u>1956</u>								
Oats at 34 lb. per bushel	lb.	17,000	36,720	-	2,176 ^{b/}	27,470	23,800	20,400
	\$	450	973	-	200	730	630	540
Mixed Grass and Legume Hay	cwt.	800	2,760	-	-	2,060	1,400	1,100
	\$	400	1,380	-	-	1,545	1,050	725
Grass and Legume Silage	cwt.	300	2,100	-	-	540	1,800	1,050
	\$	75	525	-	-	216	720	398
Corn Silage	cwt.	300	2,700	-	-	1,620	1,200	750
	\$	75	675	-	-	648	480	277
Total	cwt.	1,570	7,927	-	2,176	4,495	4,638	3,104
	\$	1,000	3,553	-	200	3,139	2,880	1,940
<u>1957</u>								
Oats at 34 lb. per bushel	lb.	23,800	44,880	-	21 ^{b/}	40,360	27,200	25,500
	\$	630	528	-	9	712	480	555
Mixed Grass and Legume Hay	cwt.	1,400	1,780	-	-	2,920	800	1,100
	\$	1,050	680	-	-	2,190	800	925
Grass and Legume Silage	cwt.	1,800	-	-	-	1,620	-	900
	\$	720	-	-	-	648	-	360
Corn Silage	cwt.	1,200	8,000	-	-	4,680	4,000	2,600
	\$	480	4,000	-	-	2,340	2,000	1,240
Total	cwt.	4,638	10,229	-	21	9,624	5,072	4,855
	\$	2,880	5,208	-	9	5,890	3,280	3,080

^{a/} After allowing for shrinkage and losses

^{b/} For seed

Table 12.-Division of Home Produced Feeds, 1956-57

Class of Feed and Year	Unit of Weight	Used on Farm This Year	Quantity for Minor Enterprises				Balance to Dairy Cattle (Total Used Less that to Other Enterprises)	
			Hogs	Sheep	Horses	Field Crops	Pounds	Tons-Equivalent
<u>1956</u>								
Oats	lb.	27,470	850	500	24,800	1,300	-	-
Mixed Grass and Legume Hay	cwt.	2,060	-	160	460	-	1,440	72
Grass and Legume Silage	cwt.	540	-	-	-	-	540	27
Corn Silage	cwt.	1,620	-	-	-	-	1,620	81
<u>1957</u>								
Oats	lb.	40,360	14,000	600	1,500	1,300	22,960	675
Mixed Grass and Legume Hay	cwt.	2,920	-	16	110	-	2,794	140
Grass and Legume Silage	cwt.	1,620	-	-	-	-	1,620	81
Corn Silage	cwt.	4,680	-	-	-	-	4,680	234

Table 13. - Feed Costs for Dairy Herd, 1956-57

Class of Feed and Year	Source	Quantity	Unit Cost or Average Value	Total Cost
<u>1956</u>			\$	\$
a) Purchased Feeds:				
Dairy Mix	Records	52.65 tons	68.36	3,599
Calf Meal	Records	1.25 tons	106.00	132
Molasses	Records	370 gal.	0.354	131
Total Purchased				3,862
b) Home-produced Feeds:				
Grass-legume hay	Table 12	72 tons	15.00	1,080
Grass Silage	Table 12	27 tons	8.00	216
Corn Silage	Table 12	81 tons	8.00	648
Milk Fed to Calves (non-standardized)	Section B.1(c)	704 cwt.	0.51	359
Total Home-produced				2,303
TOTAL COST				6,165
<u>1957</u>				
a) Purchased Feeds:				
Dairy Mix	Records	56.3 tons	70.04	3,943
Calf Meal	Records	1.0 tons	101.00	101
Molasses	Records	246 gal.	0.488	120
Total Purchased				4,164
b) Home-produced Feeds:				
Oats	Table 12	675 bu.	0.60	405
Grass-legume hay	Table 12	140 tons	15.00	2,100
Grass Silage	Table 12	81 tons	10.00	810
Corn Silage	Table 12	234 tons	8.00	1,872
Milk Fed to Calves (non-standardized)	Section B.1(c)	618 cwt.	0.51	315
Total Home-produced				5,502
TOTAL COST				9,666

3. Bedding:-If home-produced straw or hay refuse are used, estimate the quantity required on the basis of five pounds per day^{1/} per animal unit for the average number of animal units during the period which livestock are housed and charge at a nominal value per ton. If shavings or straw are purchased, these can be charged at cost.

Table 14 outlines the derivation of bedding costs for the example using oat straw at a nominal value of \$1.00 per ton. Labor costs in connection with bedding are accounted for under the previous section.

Table 14. -Bedding Costs for Dairy Herd, 1956-57

Item	Source	1956	1957
1. Number of Days in Barn	366/365 less days on Pasture (Table 3)	228	212
2. Average Number of Animal Units	Table 8	48	52
3. Tons of Bedding Required	Section B.3	27	28
4. Value per Ton (Nominal)	-	\$1.00	\$1.00
5. Cost of Bedding	(3) x (4)	\$ 27	\$ 28

4. Veterinary Expenses:-Veterinary expenses for fees and medicines amounted to totals of:

1956: \$130.00

1957: \$ 56.00

for the example farm.

5. General Dairy Supplies:-These would include disinfectants, bottle caps, and wax cartons (if a producer-vendor) and other miscellaneous supplies not included previously or in maintenance expenses on dairy equipment. For the example, these expenses were:

1956: \$ 35.00

1957: \$ 21.00

6. Miscellaneous Expenses:-These are itemized in Table 15, for the example.

^{1/} Ref. No. 15, p. 645

Table 15. -Miscellaneous Expenses on Dairy Herd, 1956-57

Expense Item	1956	1957
	\$	\$
Salt, Bonemeal, Stable Phosphate	42	50
Registration Fees for Cows and Calves	39	75
Advertising	25	-
R.O.P. Fees	23	24
Hired Trucking	7	2
Milk Producer's Licence	2	2
TOTAL	138	153

7. Interest on Production Expenses (or Working Capital) -Interest may be calculated on production expenses at the rate of six per cent annually over the relevant period of time that capital is tied up in each item and before it is returned in income. It was considered that home-produced feeds, being charged at alternative cost (market value), carried an interest charge thereby, so no further charge was made against the home-produced feeds. If home-produced feeds are charged at cost of production, six per cent interest should be levied for six months (or three per cent for 12 months). Hired labor paid monthly would be assessed an interest charge of one-twelfth of six per cent. Weekly purchases are assessed a charge of $1/52$ of six per cent (0.12 per cent).

Table 16 sets forth the derivation of the interest charges on production expenses for the example. These interest rates are only applicable to dairy farming when receipts are on a weekly basis. For the example, these expenses were negligible and could have been ignored but for illustration of the procedure they are included.

Table 16. -Interest on Dairy Production Expenses, 1956-57

Item	Source	Unit	1956	1957
Total Annual Expenditure for Items Purchased Weekly:				
Feed	Table 13	\$	3,862	4,164
Dairy Supplies	Section B.5	\$	35	21
Miscellaneous	Table 15	\$	138	153
Total		\$	4,035	4,338
Rate of Interest		%	0.12	0.12
Interest Charge		\$	4.84	5.21

C. PRODUCTION, SALES AND CREDITS FROM THE DAIRY HERD

Production records for each cow should be obtained for each lactation. This may be done by entering the herd under Record of Performance, if pure-bred, or under a provincial dairy herd improvement association, if a grade herd. If neither of these are available, daily milk records must be kept for each cow unless monthly sample weighings by a technician can be arranged. Fat production can be determined from sales records or by sampling. In the case of herds on Record of Performance, those cows that are milking but are not entered should have individual daily records kept by the owner.

Milk and dairy product sales should be converted to a standardized 3.5 per cent butterfat content basis.^{1/} The amount of standardized 3.5 per cent milk was obtained in the following manner:

$$\text{Pounds of butterfat} \div .035 = \text{Pounds of 3.5 per cent milk.}$$

Other dairy products produced, butter or cheese, should be converted to their fluid whole 3.5 per cent milk equivalent.

Production data for the example are summarized in Table 17.

Table 17. -Milk and Butterfat Production, 1956-57

Item	Unit	1956	1957
Total Milk Production (non-standardized)	lb.	311, 276	322, 748
Total Butterfat Production	lb.	11, 354	11, 666
Average Test	%	3.65	3.61
Standardized 3.5% Milk Production	lb.	324, 400	333, 314
Cows Completing a Lactation	No.	31	40
Production per Cow of 3.5% Milk	lb.	10, 465	8, 333

Milk sold and milk used in the home were also converted to the same butterfat content base of 3.5 per cent. "Other Credits" from the dairy herd included cows and bulls culled in the year, calves sold for veal, calves retained in the herd, breeding stock sold, miscellaneous items such as prizes and a credit for the value of the manure produced. Calves born during the year and retained in the herd were valued at a nominal value (\$20 each). In this case, somewhat over the price veal calves obtained when sold. Livestock culled (or eaten) were credited at sale values for such animals at the time of sale.

^{1/}Milk production may be converted to four per cent fat-corrected milk by the use of Gaines' formula:

F.C.M. (4% fat-corrected milk) = (.04 x milk) + (15 x fat). This is used for determining the efficiency of feed conversion but is not used for cost of production purposes (see Gaines and Overman, Jour. of Anim. Sci. 7, 1948, pp. 55-59).

Manure can be valued on the basis of the average number of animal units in the dairy herd in the year at seven tons of manure recovered per animal unit and for ten pounds of nitrogen, five pounds of phosphoric acid and ten pounds of potash per ton of manure*. Prices of these elements or compounds per pound were taken at current levels, namely: N at 15¢; P₂O₅ at 11¢; and K₂O at 5¢ for 1956-57. These values give a fertilizing value for manure of \$2.55 per ton.

In 1956, there were an average of 48 animal units in the dairy herd. Thus the credit for manure was:

$$48 \times 7 \times \$2.55 = \$857.00$$

In 1957, it was:

$$52 \times 7 \times \$2.55 = \$928.00$$

A further credit to be considered would be the increase in value of milk purchased and resold. The amount of milk purchased would be valued at the difference in price per hundredweight between the price paid for it and that price for which it was resold. Milk purchased for resale would normally be for fluid consumption during the higher-price periods and would be obtained to maintain a quota or supply customers (if a producer-vendor). Milk purchased for this purpose would not be included under expenses or in the sales. However, certain expenses which are included are attributable to all milk handled and distributed and these would be assumed to be offset by the gain in value of such milk. Milk fed to calves when entered under expenses was charged at its' equivalent value in protein concentrate (\$0.51 per cwt.) but when entered as a credit for value of production, it was valued at average surplus milk prices (\$2.69 per cwt. in 1956 and \$2.83 per cwt. in 1957).

Value of production and credits to the dairy herd are set forth in Table 18. (See page 27).

SUMMARY AND CONCLUSIONS

On the example farm chosen for this procedural monograph, production was for a fluid milk market with the surplus going as cheesemilk. Net production cost in 1956 was \$3.51 per hundredweight which left a small return for management after allowing for all labor costs and interest charges. In 1957, production costs rose to \$4.42 per hundredweight, largely a result of considerably increased feed costs due to dry weather and poor pastures coupled with a smaller pasture acreage. As a result of this, in 1957 a loss of 54 cents per hundredweight was experienced. This means in fact that the operators did not receive for their labor the actual charge made. The cost of labor in this year was calculated at \$1.09 per hundredweight but, after allowing for the loss of 54 cents, a net return to labor of 55 cents per hundredweight was realized. Over the two-year period of the study, fixed costs averaged 29 per cent of the total costs while variable expenses amounted to 71 per cent. Feed costs were the largest single item of expenditure, being

* Ref. No. 15, p. 644.

48 per cent of the total or \$2.40 per hundredweight. Purchased feed costs were equal approximately to the value of home-produced feed stuffs in the two-year period.

In Tables 19 to 21 (see pages 28-30) there are presented the final tabulation of the foregoing for the two years of the study.

Table 18. -Value of Production from the Dairy Herd, 1956-57

Item	Unit	1956	1957
Milk and Dairy Products (3.5% butterfat):			
1. Milk Sales	lb.	249,628	266,886
	\$	9,495	11,030
2. Milk Used in Home	lb.	2,943	2,600
	\$	110	101
3. Milk Fed to Calves	lb.	71,829	63,828
	\$	1,932	1,806
Total Milk Production - Weight (Items 1 + 2 + 3)	lb.	324,400	333,314
- Value	\$	11,537	12,937
Average Value per Cwt. of 3.5% Milk Sold (Item 1)	\$	3.80	4.13
Other Credits:			
1. Cows Culled (or Eaten)	No.	5	8
	\$	757	1,117
2. Veal Calves Sold (or Eaten)	No.	9	3
	\$	110	34
3. Calves Retained in Herd ^{a/}	No.	18	17
	\$	360	340
4. Breeding Stock Sold (all ages)	No.	6	9
	\$	1,019	1,270
5. Prizes, Miscellaneous	\$	26	2
6. Manure	\$	857	928
Total Other Credits	\$	3,129	3,691

^{a/} Number Born Less Those Sold, Eaten, or Died.

Table 19. -Summary of Annual Costs and Returns from Producing Milk, Year Ended Dec. 31, 1956

Item	Source	Total Costs and Returns for Herd	Costs and Returns		Percentage of Total Cost
			Per Cow ^{a/}	Per Cwt. of 3.5% Milk ^{b/}	
		\$	\$	\$	%
A. Fixed Costs:					
1. Buildings and Fences	Table 2	1,515	48.87	0.47	10.5
2. Use of Land (Pasture)	Table 3	293	9.45	0.09	2.0
3. Dairy Equipment	Table 5	466	15.03	0.14	3.2
4. General Equipment:					
Truck	Table 6	829	26.74	0.26	5.7
Other	Table 7	170	5.48	0.05	1.2
5. Herd Replacement and Interest	Table 9	844	27.24	0.26	5.8
6. General Farm Expenses	Table 10	638	20.58	0.20	4.4
Total Fixed Costs		4,755	153.39	1.47	32.8
B. Variable Costs:					
1. Feed:					
Purchased	Table 13	3,862	124.58	1.19	26.7
Home-produced	Table 13	2,303	74.29	0.71	15.9
2. Labor:					
Operator/s	Section B.2	3,238	104.46	1.00	22.3
Other Family	"	-	-	-	-
Hired	"	-	-	-	-
3. Bedding	Table 14	27	0.87	0.01	0.2
4. Veterinary	Section B.4	130	4.19	0.04	0.9
5. General Dairy Supplies	Section B.5	35	1.13	0.01	0.2
6. Miscellaneous	Table 15	138	4.45	0.04	1.0
7. Interest on Production Expenses	Table 16	5	0.16	-	-
Total Variable Costs		9,738	314.13	3.00	67.2
TOTAL GROSS COST		14,493	467.52	4.47	100.0
C. Credits:					
1. Cows Culled	Table 18	757	24.42	0.23	
2. Calves Sold	"	110	3.55	0.03	
3. Calves Retained in Herd	"	360	11.61	0.11	
4. Breeding Stock Sold	"	1,019	32.87	0.31	
5. Prizes, Miscellaneous	"	26	0.84	0.01	
6. Manure	"	857	27.65	0.27	
Total Credits		3,129	100.94	0.96	
Net Production Cost (Gross Cost Minus Credits)		11,364	366.58	3.51	
Value of Milk Produced	Table 18	11,537	372.16	3.56	
Return for Risk and Management	Section A.7	+173	5.58	0.05	
a/ for 31 cows	b/ for 3,244 cwt.				

Table 20. -Summary of Annual Costs and Returns from Producing Milk, Year Ended Dec. 31, 1957

Item	Source	Total Costs and Returns for Herd	Costs and Returns		Percentage of Total Cost
			Per Cow ^a	Per Cwt. of 3.5% Milk ^b	
		\$	\$	\$	%
A. Fixed Costs:					
1. Buildings and Fences	Table 2	1,515	37.88	0.45	8.3
2. Use of Land (Pasture)	Table 3	207	5.17	0.06	1.1
3. Dairy Equipment	Table 5	466	11.65	0.14	2.5
4. General Equipment:					
Truck	Table 6	860	21.50	0.26	4.7
Other	Table 7	170	4.25	0.05	0.9
5. Herd Replacement and Interest	Table 9	994	24.85	0.30	5.4
6. General Farm Expenses	Table 10	648	16.20	0.20	3.5
Total Fixed Costs		4,860	121.50	1.46	26.4
B. Variable Costs:					
1. Feed:					
Purchased	Table 13	4,164	104.10	1.25	22.6
Home-produced	Table 13	5,502	137.55	1.65	29.9
2. Labor:					
Operator/s	Section B.2	3,627	90.68	1.09	19.7
Other Family	"	-	-	-	-
Hired	"	-	-	-	-
3. Bedding	Table 14	28	0.70	0.01	0.2
4. Veterinary	Section B.4	56	1.40	0.02	0.3
5. General Dairy Supplies	Section B.5	21	0.52	0.01	0.1
6. Miscellaneous	Table 15	153	3.83	0.04	0.8
7. Interest on Production Expenses	Table 16	5	0.12	-	-
Total Variable Costs		13,556	338.90	4.07	73.6
TOTAL GROSS COST		18,416	460.40	5.53	100.0
C. Credits:					
1. Cows Culled	Table 18	1,117	27.92	0.34	
2. Calves Sold	"	34	0.85	0.01	
3. Calves Retained in Herd	"	340	8.50	0.10	
4. Breeding Stock Sold	"	1,270	31.76	0.38	
5. Prizes	"	2	0.05	-	
6. Manure	"	928	23.20	0.28	
Total Credits		3,691	92.28	1.11	
Net Production Cost (Gross Cost Minus Credits)		14,725	368.12	4.42	
Value of Milk Produced	Table 18	12,937	323.42	3.88	
Return for Risk and Management	Section A.7	-1,788	-44.70	-0.54	

a/ for 40 cows

b/ for 3,333 cwt.

Table 21. - Average Costs and Returns from Producing Milk (Two-Year Average, 1956-57)

Item	Total Annual Costs and Returns	Costs and Returns		Percentage of Total Cost
		Per Cow	Per Cwt. of 3.5% Milk	
	\$	\$	\$	%
A. Fixed Costs:				
1. Buildings and Fences	1,515	42.68	0.46	9.2
2. Use of Land (Pasture)	250	7.04	0.07	1.5
3. Dairy Equipment	466	13.13	0.14	2.8
4. General Equipment:				
Truck	844	23.79	0.26	5.1
Other	170	4.79	0.05	1.0
5. Herd Replacement and Interest	919	25.89	0.28	5.6
6. General Farm Expenses	643	18.11	0.20	4.0
Total Fixed Costs	4,807	135.42	1.46	29.2
B. Variable Costs:				
1. Feed:				
Purchased	4,013	113.05	1.22	24.4
Home-produced	3,902	109.93	1.18	23.7
2. Labor:				
Operator/s	3,432	96.69	1.05	20.8
Other Family	-	-	-	-
Hired	-	-	-	-
3. Bedding	28	0.77	0.01	0.2
4. Veterinary	93	2.62	0.03	0.6
5. General Dairy Supplies	28	0.79	0.01	0.2
6. Miscellaneous	146	4.10	0.04	0.9
7. Interest on Production Expenses	5	0.14	-	-
Total Variable Costs	11,647	328.09	3.54	70.8
TOTAL GROSS COST	16,454	463.51	5.00	100.0
C. Total Credits	3,410	96.06	1.04	
Net Production Cost	13,044	367.45	3.96	
Value of Milk Produced	12,237	344.70	3.72	
Return for Risk and Management	-807	-22.75	-0.24	

An analysis of the efficiency of utilization of the most important variable inputs, feed and labor, was undertaken. Milk production for the two-year period averaged 176,000 pounds per man-equivalent, which would indicate scope for improvement in labor utilization. A labor analysis by job breakdown was not available for the example. The feed analysis was based on the total dairy herd expressed in animal units (or as it is sometimes termed, cow-equivalents).

Tables 22 and 23 present a summary analysis of the foregoing.

Table 22. -Efficiency Analysis for Dairy Herd, 1956

Item	Unit	Total Annual Herd Requirements	Efficiency Factor	
		and Production	Per Animal Unit	Per Man- Equivalent
Animal Units in Herd (Table 3)		62		
Man-Equivalents for Dairy (Section B.2)		1.78		
Feed Consumed:				
Grain, Concentrates, Milk	lb.	181,900	2,934	102,191
Grass and Legume Hay	lb.	144,000	2,325	80,900
Silage	lb.	216,000	3,484	121,350
Pasture	ac.	120.5	1.94	67.7
Standardized 3.5 Per Cent Milk Produced	lb.	324,400	5,232	182,247
Labor Utilization:				
Total Labor on Dairy Herd	man-hr.	5,335 ^{a/}	min./day ^{b/} 17.2	hr./year 2,997
Labor for Feeding:	man-hr.	n.a.	n.a.	n.a.
Summer				
Winter				
Labor for Milking Operations:	man-hr.	n.a.	n.a.	n.a.
Summer				
Winter				

^{a/} Estimated on the basis of average performance

^{b/} On the basis of 300 working days in the year

n.a. - not available

Table 23. -Efficiency Analysis for Dairy Herd, 1957 and Average to Date (Two Years)

Item	Unit	1957			Two-Year Av. 1956-57		
		Total Annual Herd Requirements & Production	Efficiency Factor		Total Annual Herd Requirements & Production	Efficiency Factor	
			Per Animal Unit	Per Man-Equivalent		Per Animal Unit	Per Man-Equivalent
Animal Units in Herd (Table 3)		69			65.5		
Man-Equivalents for Dairy (Section B. 2)		1.95			1.86		
Feed Consumed:							
Grain, Concentrates, Milk	lb.	201,820	2,925	103,497	191,860	2,929	102,874
Grass and Legume Hay	lb.	279,400	4,049	143,282	211,700	3,232	113,512
Silage	lb.	630,000	9,130	323,077	423,000	6,458	226,810
Pasture	ac.	85.0	1.23	43.6	102.8	1.57	55.1
Standardized 3.5% Milk Produced	lb.	333,314	4,831	170,930	328,857	5,021	176,331
Labor Utilization:							
Total Labor on Dairy Herd	man-hr.	5,845 ^{a/}	min./day ^{b/} 16.9	hr./yr. 2,997	5,590	min./day ^{b/} 17.1	hr./yr. 2,997
Labor for Feeding:	man-hr.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Summer							
Winter							
Labor for Milking Operations:	man-hr.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Summer							
Winter							

^{a/} Estimated on the basis of average performance

^{b/} On the basis of 300 working days in the year

n.a. - not available.

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APPENDIX

Table 1. - Allowances in Respect of Capital Cost (Depreciation) Part XVII Rate,
1956

Depreciable Property	Rate	Depreciable Property	Rate
Aeroplanes	15	Hay Balers	10
Automobiles	15	Hay Loaders	10
Bale Elevators	10	Hydraulic and Power Take-off	
Bee Equipment	10	Attachments	10
Binders	10	Ice Machines	10
Boats and Component Parts	7.5	Incubators	10
Breakwaters-Concrete or Stone	2.5	Irrigation Equipment-	
-Wood	5	Overhead	10
Bridges-Concrete, Steel or Stone	2.5	Manure Spreaders	10
-Wood	5	Milking Machines	10
Buildings and Component Parts		Mixers	10
-Brick, Concrete or Stone	2.5	Mowers	10
-Wood or Portable	5	Nets	10
Cleaners - Grain or Seed	10	Office Equipment	10
Combines - Drawn	10	Planters - All Types	10
- Self-propelled	15	Plows	10
Coolers - Milk	10	Pumps	10
Corn Binders	10	Radar or Radio Equipment	15
Cream Separators	10	Rakes	10
Cultivators	10	Rollers	10
Cutting Boxes	10	Silo Fillers	10
Dams - Concrete, Stone or Earth	2.5	Sleighs	15
- Wood	5	Small Tools	10
Disks	10	Sprayers	10
Diggers - All Types	10	Stalk Cutters	10
Docks - Concrete, Steel or Stone	2.5	Swathers	10
- Wood	5	Tedders	10
Drills - All Types	10	Tile Drainage	2.5
Dugouts	5	Tillers - All Types	10
Electric Light Plants and Batteries		Threshers	10
(not exceeding 15 Kw.)	10	Tractors	15
Electric Motors	10	Trailers	15
Engines - Stationary	10	Trucks	15
Fences - All Types	5	Wagons	15
Forage Harvesters	10	Water Towers	5
Graders - Fruit or Vegetable	10	Weirs (Fish)	5
Grain Loaders	10	Welding Equipment	10
Grain Separators	10	Well Equipment	10
Grinders	10	Wharves-Concrete, Steel or	
Harness	10	- Stone	2.5
Harrows	10	- Wood	5
		Windchargers	10
		Windmills	10

Source: Taxation Division, Farmer's and Fisherman's Guide (Dept. of National Revenue, Ottawa). 1956 Ed., p. 14.

Table 2. -Inventory of Land and Improvements at 1956-57 Replacement Values
on the Example Farm

Item	Value	Proportion of Total	Share to Dairy	
			%	\$
Land	8,000	17.8	-	-
Fences	2,160	4.8	90% of 50%	972
House	12,000	26.7	-	-
Barn	14,400	32.2	100	14,400
Silos (two)	5,000	11.1	100	5,000
Milk House	1,270	2.8	100	1,270
Garage	580	1.3	89	516
Poultry House	1,500	3.3	-	-
Total Buildings and Fences	36,910	(82.2)		22,158
Total Buildings and Fences for Dairy		(49.3)		
Total Land and Improvements	44,910	100.0		

Table 3. -Inventory of Other Livestock on Farm

Livestock Class and Year	Number at Jan. 1	Number at Dec. 31	Average for Year	Grain Consuming		Sold or Eaten	
				Animal Units ^{a/}		No.	A. U. ^{a/}
1955-56							
Horses ^{b/}	12	12	12	1.8		1	0.15
Brood Sows	2	2	2	1.4		1	0.7
Boars	-	-	-	-		-	-
Other Hogs, 6 mo. and over	4	-	2	1.4		8	5.6
Other Hogs, under 6 mo.	-	-	-	-		-	-
Rams, 1 yr. and over	1	1	1				
				) .528		1)
Other Sheep, 1 yr. and over	23	23	23))	
				)		-	) 1.32
)
All Lambs, under 1 Yr.	10	-	5	.6		10)
Total A. U.				5.728			7.77
1956-57							
Horses ^{b/}	12	14	13	1.95		4	1.75
Brood Sows	2	2	2	1.4		2	1.4
Boars	-	-	-	-		-	-
Other Hogs, 6 mo. and over	-	-	-	-		13	9.1
Other Hogs, under 6 mo.	-	3	1.5	1.05		-	-
Rams, 1 yr. and over	1	1	1			1)
))	
Other Sheep, 1 yr. and over	23	8	15.5	) .363)	
				)		4	) 2.06
)
All Lambs, under 1 Yr.	-	-	-	-		13)
Total A. U.				4.763			14.31

^{a/} See Appendix Table 7

^{b/} A special sideline, i. e., not work horses.

Table 4. -Distribution of Cash Farm Income by Source, Two-Year Average,
1956-57

Source of Income	Percentage of Total	Percentage of Total Excluding Crops
	%	%
Fluid Milk Sales	74.8))
	) 89.1	) 89.7
Dairy Livestock	14.3))
Horses	3.7	3.7
Sheep	2.1	2.2
Hogs	4.3	4.4
Seed Grain	0.8	---
TOTAL	100.0	100.0

Table 5. -LABOR TIME*REQUIRED FOR DAIRY ENTERPRISE

Name of Operator: Name of Station:

Date: 19 .. Sample for Period:
(Month) (Day)

From:

To:

TYPE OF WORK		Head of Stock	Operator/s No.....		Family Labor No.....		Hired Labor No.....		Total Labor For Sample Period	
		No.	Hr.	Min.	Hr.	Min.	Hr.	Min.	Hr.	Min.
Feeding Cows	a. m.									
	p. m.									
Feeding Calves	a. m.									
	p. m.									
Milking	a. m.									
	p. m.									
Cleaning Utensils	a. m.									
	p. m.									
Cleaning Barns	a. m.									
	p. m.									
Bedding	a. m.									
	p. m.									
Other Work (Specify)**	a. m.									
	p. m.									
TOTAL FOR DAY/PERIOD										

*TIME given should be the total for the number of persons on the same job.

For example, if two hired men each spend 40 minutes on feeding calves, the time entered is 80 minutes (one hour and 20 minutes).

**Would include distributing milk, hauling milk to plant, picking up supplies, and other work done on a regular basis but does not include field work, maintenance on buildings and equipment, and other casual work.

Table 6. FEED REQUIREMENTS FOR DAIRY ENTERPRISE

Name of Operator: Name of Station:
 Date: 19 .. Sample for Period to
 (Month) (Day)

	Number of Head	TOTAL AMOUNT FED IN ONE DAY BY ACTUAL WEIGHING					Number of Days on Feed	TOTAL FEED REQUIRE ^a _— MENTS (to be completed by technician) Pounds
		Grains (Specify)	Protein Concen- trates & Supplements	Legume Hay	Other Hay or Straw	Silage (Specify Kind)		
Milking Cows, All Ages		lb.	lb.	lb.	lb.	lb.	Days	
Dry Cows, All Ages								
Breeding Bulls								
Young Stock, one year and over								
Calves (enter milk pail-fed under protein concentrates)								
TOTAL								

^a/ To be determined for each class of feed

Table 7. -Conversion Factors for Livestock Numbers to Grain Consuming
Animal Units

Class of Livestock	Factor
Milk Cows and Heifers, two years old and over	1.0
Heifers and Calves	0.4
Beef Cows	0.16
Cattle on Feed	2.1
All Other Cattle	0.14
Stock Sheep	0.022
Sheep and Lambs on Feed	0.12
Horses, two years old and over	1.3
Colts	0.15
Hens and Pullets	0.055
Number of Hogs Fed During Year	0.7
Chickens Raised	0.018
Broilers Raised	0.0114
Turkeys Raised	0.076

Source: United States Dept. of Agric., Agricultural Statistics
(U.S. Govt. Printing Office, Washington 25, D.C.)

Table 8. -Conversion Factors for Livestock to Animal Units on the Basis of
Manure Produced

Class of Livestock	Number of Animal Units ^{a/}
Cows, two years old and over	1
Bulls, two years old and over	1
Steers and Heifers, two years old and over	1
Young Cattle, one to two years	.5
Calves, under one year	.25
Horses, two years old and over	1
Young Horses, one to two years old	.5
Colts, under one year old	.25
Brood Sows	.33
Hogs fed to 200 pounds weight	.20
Sheep, one year old and over	.143
Lambs	.071
Hens	.01
Turkeys	.02
Geese	.02

a/ An animal unit is the approximate equivalent from the standpoint of feed required and manure produced during a year, of a mature horse or cow. The term is used for purposes of comparing different classes of animals and to compute the total amount of livestock on farms, on a cow-equivalent basis, though it is not strictly an exact measure.

Source: Hare, H. R. Farm Business Management
(Ryerson Press, Toronto, 1946). pp. 207-208.

INFORMATION SHEET

The following is a generalized summary of information and data required for an analysis of the factors affecting the costs of production and returns from milk production.

1. Cost Factors:

- a) A complete inventory of all buildings and improvements
 - replacement values, including labor cost
 - type of construction, condition of buildings
 - design
 - size
 - average maintenance costs
- b) Appraised value of land for agricultural purposes at 'normal' sale values
- c) A complete equipment inventory
 - replacement values
 - average maintenance costs
- d) A complete livestock inventory
 - breed
 - age of each animal
 - replacement values for each class
- e) A complete cash account record
 - receipts (quantity and value)
 - expenses (quantity and value and overhead expenses for taxes, insurance, etc.)
- f) A record of food produced on the farm and used in the home

2. Management Factors:

- a) Production records of milk and butterfat for each cow completing a lactation
 - number of days in each lactation
 - date of freshening of each cow
 - age of each cow
 - condition of cow at calving
 - length of time between milkings
- b) Record of feeds and supplies produced on the farm and consumed by the dairy herd
 - quantity and farm value
 - quality of feed
 - frequency of feeding

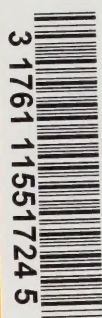
- c) Dates dairy cattle put out on pasture in spring and taken off in fall
 - condition of pastures
 - type of pasture
 - acreage of pasture

d) Crop production and land utilization records for the whole farm, in addition to above (c).

- e) Type of water supply
 - where available to livestock
 - frequency of watering

- f) Weather conditions for year
 - summer
 - winter

- g) Record of total labor supply
 - amount for each enterprise
 - time on various jobs
 - quality of labor



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